HL7 Interface

HL7 messaging with Radiology/Nuclear Medicine V. 5.0 can be divided into two categories:

1. **Messages initiated by outside sources, e.g. vendor systems (COTS) or Vista applications other than Radiology/Nuclear Medicine**

   a) **Query** A typical query message initiator would be a voice recognition reporting system that queries for unreported imaging exams, then displays them to the interpreting radiologist for selection of the particular case for which s/he wants to enter findings. Queries are processed by routines in the RAHLQ* namespace.

   b) **Report Transmission** Reports can be transmitted to Radiology/Nuclear Medicine from vendor equipment such as voice recognition systems, or other **V***IST***A** applications. Reports are processed by routines in the RAHLO* namespace. In this release, these routines have been rewritten to open the door to accept report data from potentially any source within or outside of **V***IST***A**, with or without the use of HL7 messages. See input data comments in the RAHLO routine for more information if you are doing local interface development.

   To continue to support existing interfaces that may rest on older backwards compatible versions of the HL7 package, and to account for potential differences in the content of these incoming messages, the creation of an M routine that will act as a "bridge" may be necessary for new interfaces if they cannot work with existing bridge programs. The bridge program parses the HL7 message and places it in a consistent format for the Radiology/Nuclear Medicine software (RAHLO*) that does error checking, data filing or retrieval, and takes other appropriate action such as updating exam and order statuses, sending alerts and bulletins, etc. Bridge programs included in this package are in the RAHLB* namespace.

   vendor's HL7 report msg → Vista HL7 → bridge program → Rad/Nuc Med

2. **Messages initiated or 'broadcast' by the V*IST*A Radiology/Nuclear Medicine application**

   These messages are typically consumed by vendor PACS systems, the **V***IST***A** Imaging/Multi-Media system, and some voice recognition reporting systems. Messages are "broadcast" from **V***IST***A** Radiology/Nuclear Medicine whenever an imaging exam is registered, examined (i.e., when images have been collected), canceled or reported. This interface rests on the **V***IST***A** HL7 version 1.6 features, which use "protocol event points" and allow multiple subscribers who can be other **V***IST***A** applications or outside vendors.

   Rad/Nuc Med → Vista HL7 → subscriber

A Radiology/Nuclear Medicine related entry for the **V***IST***A** HL7 Application Parameter file (#771) is exported with this version. The exported entry contains the following data:

1) Name:	RADIOLOGY
Active/Inactive:	Inactive
HL7 Encoding Characters:	~|\&
HL7 Field Separator:	^
HL7 Message: ACK:	Processing Routine: none
HL7 Message: ORF:	Processing Routine: none
HL7 Message: ORU:	Processing Routine: RAHLBKVR
HL7 Message: QRY:	Processing Routine: RAHLBKVQ

The above entry is necessary for HL7 message exchange with the existing vendor supplied voice recognition units that rely on the voice recognition interface released in 1992 with Radiology V4.0.

Please refer to the **V***IST***A** Health Level Seven package documentation to set up and maintain the Radiology/Nuclear Medicine HL7 interface with any applications your facility has (e.g., voice recognition systems, PACS systems and other vendor or **V***IST***A** -to- **V***IST***A** applications).

See Appendix A for a description of the specific HL7 messages, segments and fields used when the Rad/Nuc Med package sends/receives an HL7 message.

See Appendix B for a list of records exported, and instructions and sample file setup so that HL7 messages may be sent to another application when a report is verified, or an exam is registered, examined or canceled.

See Appendix C for additional setup for the older (1992) voice recognition system interface.

See Appendix D (Radiology/Medspeak Interface) for instruction on the setup and maintenance of an interface between VISTA's Radiology/Nuclear Medicine and MedSpeak.

Since some vendors reuse message numbers, it is very important that you run the appropriate HL7 package option to purge all successfully transmitted entries on a frequent basis. Refer to the HL7 manual for instructions.

Appendix A

This appendix describes interfaces to the Radiology/Nuclear Medicine package based upon HL7 messaging standards. The HL7 messages form the basis for the exchange of health care information between the **V*IST*A** Radiology/Nuclear Medicine package and all non- **V*IST*A** systems that generate Radiology/Nuclear Medicine results information in the form of reports and impressions, or require data about Radiology/Nuclear Medicine exam registration, exam completion, cancellation, and results reports.

The following HL7 **messages** are used to support the exchange of Radiology/ Nuclear Medicine data:

ACK	General Acknowledgment
ORF	Observational Report Response
ORM	Order
ORU	Observational Results Unsolicited
QRY	Query Message

The following HL7 **segments** are used to support the exchange of Radiology/ Nuclear Medicine data:

MSA	Message Acknowledgment
MSH	Message Header
OBR	Observational Request
OBX	Result
ORC	Common Order
PID	Patient Identification
QRD	Query Definition

The following HL7 **fields** may be used to support the exchange of Radiology/ Nuclear Medicine data for each of the segments listed above. (Not all fields are used in all messages; see indications on the table below and examples that follow.)

Key for field usage:
Vn = Vendor-initiated message, where n can be one or more of the following:

1 - vendor's (or other application's) SSN query
2 - **V*IST*A** Rad/Nuc Med Response to SSN query
3 - vendor's (or other application's) Case Number query
4 - **V*IST*A** Rad/Nuc Med Response to Case Number query
5 - vendor's (or other application's) findings report
6 - **V*IST*A** Rad/Nuc Med Response to findings report (acknowledgment)

Rn = Message initiated ('broadcast') by **V*IST*A** Radiology/Nuclear Medicine, where n can be one or more of the following:

1 - **V***IST***A** Rad/Nuc Med Exam Registration message
2 - **V***IST***A** Rad/Nuc Med Exam Cancellation/Deletion message
3 - **V***IST***A** Rad/Nuc Med Examined/Images collected message
4 - **V***IST***A** Rad/Nuc Med Report Released or Verified message

Segment	Field Seq #	Field Element Name and Values	Where Used
MSA	1	Acknowledgment Code (AA=Accepted, AE=Error, & AR=Rejection)	V246
	2	Message Control ID	V246
	3	Text Message (contains the reason a query or findings report was invalid)	V6
MSH	1	Field Separator (determined by **V***IST***A** HL7 package set-up)	V123456 R1234
	2	Encoding Characters (determined by **V***IST***A** HL7 package set-up)	V123456 R1234
	3	Sending Application (determined by **V***IST***A** HL7 package set-up or vendor)	V123456 R1234
	4	Sending Facility (determined by **V***IST***A** HL7 package set-up or vendor)	V123456 R1234
	5	Receiving Application (determined by **V***IST***A** HL7 package set-up)	V123456 R1234
	6	Receiving Facility (determined by **V***IST***A** HL7 package set-up)	V123456 R1234
	7	Date/Time of Message	V123456 R1234
	8	Security (applicable only to messages incoming to **V***IST***A**)	V135
	9	Message Type and Event Code	V123456 R1234
	10	Message Control ID (determined by **V***IST***A** HL7 package or vendor)	V123456 R1234
	11	Processing ID (determined by **V***IST***A** HL7 package set-up)	V123456 R1234
	12	Version ID (determined by **V***IST***A** HL7 package set-up)	V123456 R1234

HL7 ORC Field	Registration	Cancel/Delete	Examined	
1-Order Control	NW	CA	XO	
5-Order Status	IP	CA		CM

The Mode of Transportation value on the OBR segment (in the example above, ~~~~~R) is omitted from the cancellation message.

Please also be aware that the OBR segment may exceed 255 characters. This means that other **V*IST*A** applications will have to receive those segments in an array. See the **V*IST*A** Health Level Seven manual for more information about the method for handling segments greater than 255 characters. Outside vendor recipients should not be affected since they receive the message as a data stream.

When a report is **Verified** or **Released/Not Verified** by the Radiology/Nuclear Medicine package, an Observational Results Unsolicited (ORU) message is sent to the site specified application. The ORU message consists of the following segments:

MSH Message Header
PID Patient Identification
OBR Observational Request
OBX Result

Example: ORU message containing report for single procedure

```
      MSH^~|\&^RADPACS^578^PACS^HINES^199504121040^^ORU~R01^170^P^2.1
      PID^^714-26-2873^374~3~M11^^LIME~HARRY^^19080817^M^^^^^^^^^^714262873
      OBR^^^7049587.8959-1~041295-334~L^76020~X-RAYS FOR BONE AGE~CPT4~423~
BONE
AGE~99RAP^^^199504121040^""^""^^^^^19950412150219^^4507~TAYLOR,FRANK^^1N^^^^1
99504121503^^^F^^^^^^^4505~HILLER~CINDY^4532~FLASHCARD~FERGUS
      OBX^^TX^I~IMPRESSION~L^^This is the first line of impression text on
the report record.^^^^^^F
      OBX^^TX^I~IMPRESSION~L^^The second line of impression text on the
report record.^^^^^^F
      OBX^^TX^I~IMPRESSION~L^^The third line of impression text on the report
record.^^^^^^F
      OBX^^ST^D~DIAGNOSTIC CODE~L^^POSSIBLE MALIGNANCY, FOLLOW-UP
NEEDED^^^^^^F
      OBX^^ST^D~DIAGNOSTIC CODE~L^^ABNORMALITY, ATTN. NEEDED^^^^^^F
      OBX^^TX^R~REPORT~L^^This is the first line of report text in the report
record.^^^^^^F
      OBX^^TX^R~REPORT~L^^The second line of report text.^^^^^^F
      OBX^^TX^R~REPORT~L^^The third line of report text.^^^^^^F
      OBX^^CE^P~PROCEDURE~L^^423~BONE AGE~L^^^^^^""
      OBX^^TX^M~MODIFIERS~L^^PORTABLE EXAM^^^^^^""
```

Example: ORU message for "printset", (i.e., multiple procedures and single report):

```
      MSH^~|\&^RADPACS^578^PACS^HINES^199504121040^^ORU~R01^170^P^2.1
      PID^^149-16-
2645^43~7~M11^^FICKEN~LEON~P^^19100606^M^^^^^^^^^^149162645
      OBR^^^7029871.8488-1~012897-436~L^73600~X-RAY EXAM OF ANKLE~CPT4~
161~ANKLE 2VIEWS~99RAP^^^19970128151l^""^""^^^^^19970128155928^^4599~
ORDERER~ORVILLE^^^^EMERGENCY ROOM^^19970128160O^^^F^^^^^^^4505~HELLER~CINDY
      OBX^^CE^P~PROCEDURE~L^^161~ANKLE 2 VIEWS~L^^^^^^""
      OBR^^^7029871.8488-2~012897-439~L^73620~X-RAY EXAM OF
FOOT~CPT4~165~FOOT 2
VIEWS~99RAP^^^19970128151l^""^""^^^^^19970128155928^^4599~ORDERER~ORVILLE^^^
^EMERGENCY ROOM^^19970128160O^^^F^^^^^^^4505~HELLER~CINDY
      OBX^^CE^P~PROCEDURE~L^^165~FOOT 2 VIEWS~L^^^^^^""
      OBR^^^7029871.8488-3~012897-440~L^73660~X-RAY EXAM OF TOE(S)~CPT4~168~
TOE(S) 2 OR MORE VIEWS~99RAP^^^19970128151l^""^""^^^^^19970128155928^^4599~
ORDERER~ORVILLE^^^^EMERGENCY ROOM^^19970128160O^^^F^^^^^^^4505~HELLER~CINDY^
4515~SPOCK~DOCTOR
      OBX^^CE^P~PROCEDURE~L^^168~TOE(S) 2 OR MORE VIEWS~L^^^^^^""
      OBX^^TX^I~IMPRESSION~L^^TOE FRACTURES.^^^^^^F
      OBX^^ST^D~DIAGNOSTIC CODE~L^^ABNORMALITY, ATTN. NEEDED^^^^^^F
      OBX^^TX^R~REPORT~L^^FOUND EVIDENCE OF SEVERAL FRACTURES IN R. FOOT,
 IN ALL 5 TOES.^^^^^^F
      OBX^^TX^M~MODIFIERS~L^^PORTABLE EXAM^^^^^^""
```

If the receiving application is outside of **V*IST*A**, it should then send a General Acknowledgment (ACK) message back to the HL7 package. The ACK message consists of the following segments:

MSH Message Header
MSA Message Acknowledgment

Example:

```
      MSH^~|\&^PACS^HINES^RADIOLOGY^578^199504121041^^ACK^170^P^2.1
      MSA^AA^170
```

Appendix D: Radiology/MedSpeak Interface

INTRODUCTION

Full TCP/IP support for messaging is available with patch HL*1.6*19. Two links are required for message transactions. One link is used by VISTA to send messages and receive acknowledgements to those messages. The other link is used by MedSpeak to send messages and receive acknowledgements to those messages.
(The sent message and the acknowledgement to that sent message comprise a full transaction.)

VISTA messages can be any one of the following :

1) registration,
2) cancellation,
3) examined (i.e., images collected, usually set up in sites using the VISTA Imaging package and/or a PACS system), and
4) VISTA reports verified and released not verified. (These reports must be sent to MedSpeak in order to synchronize VISTA and MedSpeak's databases.)

MedSpeak messages can only be reports.

REQUIREMENTS

All released HL7 and Kernel patches must be installed. In addition, patch HL*1.6*19, and Rad/Nuc Med patch RA*5*4 that automatically populates the set-up files (as shown in **Setup of HL7 Files** later in this document) must be installed.

Processes that must be up and running to support the interface include the two VISTA HL7 links (RA-MED and MED-RA) and the two MedSpeak services (RIS Interface Agent and VA Proxy).

Alpha/AXP sites running more than one instance of TaskMan must run TaskMan from DCL Context. Please refer to the **SETUP OF HL7 FILES** section of this document to determine the impact on the Startup Node field for file 869.2.

Please consider putting the MedSpeak PC on a UPS. Power blips and outages have proven to be a problem in reliable message transmission.

IRM and ADPAC Set-up Procedures

1. Most of the VISTA HL7 file setup will be done by the patch installation, but some must be manually completed by IRM. See a sample of the VISTA setup in Setup of HL7 Files, later in this appendix.

2. You must provide the TCP/IP address for the MedSpeak unit and TCP/IP port numbers for both VISTA and MedSpeak . See a sample of the VISTA setup in Setup of HL7

Files, later in this appendix. (Note: depending on your operating system, you may or may not have to input a TCP/IP Address for the listener.)

3. The Rad/Nuc Med coordinator who supports the MedSpeak unit must follow the MedSpeak documentation/instructions for proper user definition. The Physician ID field in the MedSpeak user set-up must be **identical** to the corresponding username in the .01 field of the VISTA New Person file #200. This is the name that will be entered as the verifying physician for medical/legal purposes. Reports will be rejected if the MedSpeak field is not identical to the New Person NAME field.

4. The Rad/Nuc Med coordinator who supports the MedSpeak unit must follow the MedSpeak documentation/instructions for defining Rad/Nuc Med diagnostic codes. Diagnostic codes on the MedSpeak unit must be **identical** to the active diagnostic codes in VISTA File #78.3. Diagnostic codes **or code numbers** may be used during dictation. Since it will be quicker for them to enter the code numbers, interpreting physicians may want to have a printed list of code numbers and text (VISTA Diagnostic Codes file #78.3, fields .001 and .01) next to the MedSpeak machine as they dictate.

5. If the MedSpeak interface is moved from a test account to the production account, update the TCP/IP port numbers on both sides, and delete the MedSpeak database (using SQL commands) to prevent cross-over of test data to the live account. (The change of port numbers ensures a unique socket connection. But the TCP/IP address of the MedSpeak remains the same.)

6. Make sure all other MedSpeak setup is correct and complete according to MedSpeak documentation.

7. It is helpful to synchronize the MedSpeak PC clock to closely agree with the VISTA system clock.

8. Responsibility for starting, stopping, and monitoring the links can belong to IRM, or IRM can delegate this to the Rad/Nuc Med coordinator with the understanding that if problems occur, IRM may have to provide support.

9. MedSpeak users and IRM should learn how to find and interpret error messages for rejected reports. If VISTA Rad/Nuc Med rejects a report sent by MedSpeak, an error message is sent back to MedSpeak. See MedSpeak documentation regarding rejected report acknowledgement messages.

10. This interface requires link tasks to always start up on the same node. So, if your site is an Alpha/AXP site running more than one instance of TaskMan, you should start up TaskMan in DCL context. Consult the Kernel System Manual for instructions on running TaskMan in DCL context.

STARTUP AND RECOVERY

Components for link operation include the two VISTA HL7 links (RA-MED and MED-RA) and two MedSpeak services (RIS Interface Agent and VA Proxy).

> **For sites running a Single Listener:** If either HL7 link goes into an 'ERROR' state on the HL7 Messaging Monitor screen (viewable under HL7 package V.1.6 Options, Communications Server, Systems Link Monitor), both HL7 links must be stopped and restarted.
>
> **For sites running a UCX Listener:** If the RA-MED link goes into an 'ERROR' state on the HL7 Messaging Monitor screen (viewable under HL7 package V1.6 Options, Communications Server, Systems Link Monitor), the RA-MED HL7 link must be stopped and restarted. Ignore the Device On-Line and State of the MED-RA HL7 link. It is not accurately reflected in the Systems Link Monitor. MED-RA is linked to the HL7 handling UCX Service. Once this UCX Service is enabled, it does not need to be brought down for startup and recovery.

If there are errors on the MedSpeak side, the VA Proxy and RIS Interface Agent services may have to be stopped and restarted. If an application error box pops up, the MedSpeak unit may have to be rebooted.

If you need to either (1) reboot the MedSpeak machine or (2) shutdown the MedSpeak VA Proxy and RIS Interface Agent, you must do the following to prevent message loss:

> **Single Listener system**: Stop both VistA HL7 links (RA-MED and MED-RA) in any order.
>
> **UCX Listener system**: Stop only the RA-MED link.

If you need to shutdown the VISTA machine, you must do the following to prevent message loss:

> **Single Listener system**: Stop both VistA HL7 links (RA-MED and MED-RA) in any order.
>
> **UCX Listener system**: Stop only the RA-MED link.

Detailed Explanation of Start-up/Recovery Procedure

1. Stop the appropriate links from the HL7 Main Menu, V. 1.6 OPTIONS, Communications Server, Stop LLP:

   Single Listener system: Stop both VistA HL7 links (RA-MED and MED-RA) in any order.

   UCX Listener system: Stop only the RA-MED link. (You do NOT need to shut down the UCX listener. Generic UCX tools control UCX services.)

2. If necessary, boot or reboot the MedSpeak unit (i.e., reboot only if an application error occurred on the MedSpeak unit, or a previous attempt at recovery has failed). Rebooting can be done using the Start button and selecting 'Shut Down'. To gain more control over the VA Proxy and RIS Interface agent on the MedSpeak machine, you can set up these services to start manually rather than auto-start. If they are set up to auto-start, they both should start automatically during reboot.

3. If VA Proxy is not set up to start automatically, on the MedSpeak unit, use the Start button, Settings, Control Panel, Services, then select VA Proxy to get a pop-up box and click on 'start'. The status of the VA Proxy should change from null to 'started'.

4. If RIS Interface Agent is not set up to start automatically, within Services (see previous mention in this appendix), select RIS Interface Agent and click on 'start'. The status of the RIS Interface Agent should change from null to 'started'.

5. On Open-M/Cache systems only, it is a good idea to kill off the logical link listener job (%ZISTCP) before restarting the links. This step is optional, but will prevent an extinct job from unnecessarily using up CPU time. Use the system status utility to find these jobs. They appear as running the %ZISTCP routine using port numbers that you entered as TCP/IP PORT in the setup (i.e., File #869.2, Field #400.02 TCP/IP PORT, for entries RA-MED and MED-RA). This step may be unnecessary after additional HL7 package patches.

6. Start the "listener link" MED-RA:

   Single Listener system: From the HL7 Main Menu, V. 1.6 OPTIONS, Communications Server, Start LLP, enter MED-RA at the 'Select HL LOGICAL LINK NODE:' prompt, then press enter to accept the default of 'BACKGROUND' at the 'Method for running the receiver;' prompt.

   UCX Listener system: No action is needed. The listener is a UCX service and UCX starts running when OpenVMS is brought up.

7. Verify that the listener link is up and running:

Single Listener system: From the HL7 Main Menu, V. 1.6 OPTIONS, Communications Server, Systems Link Monitor, use the Systems Link Monitor option to display the Messaging Monitor and verify that the link you just started is up and running. (When a link is up and running, its state usually changes between LISTEN and READING.) Sometimes it takes 10 seconds or more for a link to start. It will depend on the response time and how quickly TaskMan handles the jobs.

UCX Listener system: The UCX service should be enabled. The columns indicating message totals for the MED-RA HL7 link are accurately reflected in the System Link Monitor. Disregard the information presented in the Device On-Line and State columns for the MED-RA HL7 link.

8. Start the "sender" link RA-MED: From the HL7 Main Menu, V 1.6 OPTIONS, Communications Server, Start LLP.

   Single and UCX Listener systems: Enter MED-RA at the 'Select HL LOGICAL LINK NODE:' prompt, then press enter to accept the default of 'BACKGROUND' at the 'Method for running the receiver;' prompt.

Use the Systems Link Monitor option again to verify that all links are up and running.

Start-up/Recovery Procedure Quick Reference

Radiology/MedSpeak Interface

Step	Machine	Action	Mandatory, Optional, or Conditional
1	**VISTA**	**Single Listener system: Shut down logical links (in any order)** **UCX Listener system: Shut down the RA-MED link.**	**Mandatory**
2	MedSpeak	Reboot	Only if MedSpeak application error occurred or MedSpeak PC suffered power loss, etc.
3	MedSpeak	Start up VA Proxy (if applicable) first, then RIS Interface Agent	Only if down and not set to auto-start
4	VISTA (Open-M / Cache only)	Kill the old logical link listener job (%ZISTCP with port matching TCP/IP PORT no. used by the MED-RA link)	optional
6	**VISTA**	**Single Listener system: start the MED-RA listener logical link** **UCX Listener: enable the UCX Service (if disabled)**	**Mandatory**
7	**VISTA**	**Start the sender logical link: RA-MED**	**Mandatory**

Note: If the MedSpeak VA Proxy or the RIS Interface Agent jobs go down, the recovery process is necessary.
Single Listener system: Shutdown both RA-MED and MED-RA links
UCX Listener system: Shutdown the RA-MED link

If the VISTA machine is going to be shutdown:
Single Listener systems: Shut down both HL7 links.
UCX Listener systems: Shut down the RA-MED link.

OPERATIONAL FEATURES

1. When an exam is registered, it should be retrievable in the MedSpeak database, and you should be able to enter a report for it.

2. When an exam is cancelled or deleted, it should be removed from the MedSpeak database, and you should not be able to enter a report for it.

3. If a verified report exists on the VISTA Rad/Nuc Med system for an exam, you should no longer be able to enter a report on MedSpeak. However, you should be able to enter an addendum on MedSpeak.

4. An addendum entered on MedSpeak should cause the report on VISTA to be automatically unverified, updated, *and* re-verified. The contents of the re-verified report should be viewable through VISTA's options: Supervisor menu, then Access Uncorrected Reports. (Although MedSpeak does not receive a message when the report is unverified, MedSpeak will receive a message when the report is re-verified.)

5. If a MedSpeak report is rejected by VISTA Rad/Nuc Med software, the report should NOT be filed in the Rad/Nuc Med Report database.

6. If a diagnostic code that is entered via MedSpeak is not an entry in File #78.8, DIAGNOSTIC CODES, the report should be rejected with an appropriate error message.

7. If an unauthorized user attempts to enter a report on the MedSpeak unit, the report should be rejected with an appropriate error message. An unauthorized user is someone who either (1) doesn't have a Rad/Nuc Med staff or resident classification or (2) has a classification inactive date that is prior to the report date.

8. If a resident or staff interpreting physician without the RA VERIFY key enters a report on MedSpeak, the report should be filed, but should be in a 'DRAFT' status (or a 'RELEASED/NOT VERIFIED' status if site parameters allow it).

9. If the division where the exam was performed does not allow residents to verify reports, reports entered on MedSpeak by residents should go into 'DRAFT' status (or a 'RELEASED/NOT VERIFIED' status if site parameters allow it).

10. If the division where the exam was performed requires impression text, and the MedSpeak report does not include impression text, the report should be rejected with an appropriate error message.

11. If the impression text or the report text consists of a single character or any number of special (non-alphanumeric) characters, the report should be rejected with an appropriate error message.

12. If a MedSpeak report is transmitted at the same time a user is entering a report for the same case through VISTA Rad/Nuc Med in the Report Entry/Edit option, the MedSpeak report should be rejected with an appropriate error message.

13. If a MedSpeak report is transmitted at the same time a user is case editing a case that is a member of the same printset, the MedSpeak report should be rejected with an appropriate error message.

14. If a MedSpeak report is transmitted at the same time a user is status tracking a case that is a member of the same printset, the MedSpeak report should be rejected with an appropriate error message.

15. If the MedSpeak user does not have security privileges to verify a report, the report should be rejected with an appropriate error message. Requirements include the RA VERIFY key, no INACTIVE DATE in File #200, Field #53.4 (e.g., the verifier must be an active provider), Rad/Nuc Med staff or resident classification if site parameters allow residents to verify, or staff classification if site parameters don't allow residents to verify.

16. Reports entered through MedSpeak should be viewable, printable, etc. through VISTA Rad/Nuc Med, Health Summary, mail messages, and alerts in a way identical to that of reports entered through VISTA Rad/Nuc Med. All options operating on reports should behave the same whether the source of the report was VISTA or MedSpeak.

17. Since MedSpeak reports do not include an electronic signature, when they appear in VISTA they should not contain an electronic signature. If the MedSpeak user has report verification privileges, however, and the report data from MedSpeak meets all site criteria for verification, the report should go to a 'VERIFIED' status.

18. When a MedSpeak report for a printset is transmitted and results in an accepted, verified report on VISTA, all members of the printset on VISTA should now include the same report when retrieved through patient profiles, View Exam by Case No., etc. Also, the report content should include the procedures for all members of the set.

19. If the site has the GENERATE EXAMINED HL7 MESSAGE field set to 'yes' on one or more statuses in File #72, the "examined" messages generated should have no effect on MedSpeak.

20. MedSpeak users are not allowed to group sets of exams together and mark them for a single report through MedSpeak. That process is handled through VISTA. MedSpeak users should be able to select a single exam in a printset and enter a report on it. After the report is transmitted to VISTA, it should apply to all printset members on VISTA, and the MedSpeak database should be automatically updated to mark the other printset members so that they can no longer be selected for report entry.

21. If a report is entered in MedSpeak as 'preliminary', when it reaches VISTA, it should be set to 'DRAFT' or, if the site parameters allow, 'RELEASED/NOT VERIFIED'.

SETUP OF HL7 FILES

The sample setup shown below includes notes on corresponding MedSpeak setup where applicable. All of this setup, except for site-specific fields, will be done automatically by the Rad/Nuc Med patch RA*5*4. However, the site will be responsible for entering the TCP/IP address, TCP/IP port numbers, Startup Node and other fields that are site-specific (these items are shown in bold).

The sample setup reflects a system already up and running. Many of the fields are populated by the HL7 package during operation. **IRM should only populate the fields in bold print. Your responses should be specific to your site, and not necessarily what you see below.** Also see the Message Flow Diagram, later in this appendix, to get a better understanding of the relationships between message transactions and setup.

HL7 APPLICATION PARAMETER FILE #771 and MedSpeak's agentapp.ini :

NAME: RA-CLIENT-TCP ACTIVE/INACTIVE: ACTIVE
FACILITY NAME: **MEDSPEAK** COUNTRY CODE: US

The following 2 records should already be in your file #771
They were included in patch RA*4.5*10:

NAME: RA-CLIENT-IMG ACTIVE/INACTIVE:ACTIVE
FACILITY NAME: **499** COUNTRY CODE: US

NAME: RA-SERVER-IMG ACTIVE/INACTIVE:ACTIVE
FACILITY NAME: **HINES CIOFO** COUNTRY CODE: US

(The above record, RA-SERVER-IMG, is sent again via the RAD/NUC MED patch for MedSpeak.)

Notes: See vendor documentation for more information on MedSpeak setup. The following items are a subset that correlate to VISTA setup.

The MedSpeak agentapp.ini file should have the same application names as the HL7 Application Parameter file. This is used by HL7 to determine who the senders and receivers are in the message header, and to route incoming messages properly. In this example, the agentapp.ini file on the MedSpeak machine would contain the following:

SendingApplication = **RA-CLIENT-TCP**
SendingFacility = **MEDSPEAK**
ReceivingApplication = **RA-SERVER-IMG**
ReceivingFacility = **HINES CIOFO**

Also, the Domain name of the MedSpeak unit on your LAN must be known to the MedSpeak unit (see instructions from vendor).

The MedSpeak agentapp.ini file should contain a line defining the OBX-3 format used by VISTA Rad/Nuc Med for clinical history, allergies, and modifiers. Usually, the line that should appear in agentapp.ini is:

OBXIDFilter = /H~HISTORY~L/A~ALLERGIES~L/M~MODIFERS~L/

The ~ character should be the first character of the string that is stored in File #771 (HL7 APPLICATION PARAMETER), field HL7 ENCODING CHARACTERS. If this field is null, the encoding character would default to ~ . However, if this field stores a string that begins with a different character, you would need to substitute the ~ in the OBXIDFilter with the first character of that string.

The TriggerEvent in the agentapp.ini file on the MedSpeak machine should normally be set as follows to indicate the event code of a report message:

TriggerEvent = R01

In order to tell MedSpeak that the VA observation value for final results on report messages is an 'F', the agentapp.ini file should contain the following line:

OBRObservationValue = F

The set-up example below shows TCP/IP PORT entries in File #869.2 (HL LOWER LEVEL PROTOCOL PARAMETER).

PROTOCOL FILE #101 :

The event driver entries (RA REG, RA EXAMINED, RA CANCEL, and RA RPT) are distributed with the Rad/Nuc Med VISTA package, and are also event driver protocols for the messages broadcasted to PACS/Imaging and other subscribers.
(Please refer to Appendix B of the Radiology/Nuclear Medicine Technical Manual for information about messages initiated by Radiology/Nuclear Medicine.)
The other protocols shown below are part of the MedSpeak/Radiology interface. For the purposes of the MedSpeak interface, you need to **add RA TCP ORM** as an Item in the "ITEM" multiple of the ORM event driver protocols, **and add RA TCP ORU** as an Item in the "ITEM" multiple of the ORU event driver protocol as shown below. There may already be other entries in the "ITEM" multiple field that are active or placeholder entries for other interfaces. Do not add or delete any other entries in the "ITEM" multiple.

NAME: RA REG ITEM TEXT: Rad/Nuc Med exam registered
TYPE: event driver CREATOR: 0
PACKAGE: RADIOLOGY/NUCLEAR MEDICINE
DESCRIPTION: This protocol is triggered whenever a Radiology/Nuclear Medicine exam is registered. It executes code that creates an HL7 ORM message consisting of PID, ORC, OBR and OBX segments. The message contains all relevant information about the exam, including procedure, time of registration, procedure modifiers, patient allergies, and clinical history.
ITEM: **RA TCP ORM**
ITEM: RA SEND ORM
ENTRY ACTION: Q TIMESTAMP: 57233,56309

SERVER APPLICATION: RA-SERVER-IMG
EVENT TYPE: O01
VERSION ID: 2.1
MESSAGE TYPE RECEIVED: ORM
PROCESSING ID: PRODUCTION
GENERATE/PROCESS ACK ROUTINE: Q

NAME: RA CANCEL
ITEM TEXT: Rad/Nuc Med exam cancellation
TYPE: event driver
CREATOR: 0
PACKAGE: RADIOLOGY/NUCLEAR MEDICINE
DESCRIPTION: This protocol is triggered whenever a Radiology/Nuclear Medicine exam is cancelled. It executes code that creates an HL7 ORM message consisting of PID, ORC, OBR and OBX segments. The message contains all relevant information about the exam, including procedure, time of cancellation, procedure modifiers, patient allergies and clinical history.
ITEM: RA SEND ORM
ITEM: **RA TCP ORM**
ENTRY ACTION: Q
SERVER APPLICATION: RA-SERVER-IMG
EVENT TYPE: O01
VERSION ID: 2.1
TIMESTAMP: 57240,38007
MESSAGE TYPE RECEIVED: ORM
PROCESSING ID: PRODUCTION
GENERATE/PROCESS ACK ROUTINE: Q

NAME: RA EXAMINED
ITEM TEXT: Rad/Nuc Med examined case
TYPE: event driver
CREATOR: 0
PACKAGE: RADIOLOGY/NUCLEAR MEDICINE
DESCRIPTION: This protocol is triggered whenever a Radiology/Nuclear Medicine exam has reached a status where GENERATE EXAMINED HL7 MSG is Y at that (or at a lower) status. This message contains all relevant information about the exam, including procedure, time of registration, procedure modifiers, patient allergies, and clinical history.
ITEM: RA SEND ORM
ITEM: **RA TCP ORM**
ENTRY ACTION: Q
SERVER APPLICATION: RA-SERVER-IMG
EVENT TYPE: O01
VERSION ID: 2.1
TIMESTAMP: 57240,38013
MESSAGE TYPE RECEIVED: ORM
PROCESSING ID: PRODUCTION
GENERATE/PROCESS ACK ROUTINE: Q

NAME: RA RPT
ITEM TEXT: Rad/Nuc Med report released/verified
TYPE: event driver
CREATOR: 0
PACKAGE: RADIOLOGY/NUCLEAR MEDICINE
DESCRIPTION: This protocol is triggered whenever a Radiology/Nuclear Medicine report enters into a status of Verified or Released/Not Verified. It executes code that creates an HL7 ORU message consisting of PID, OBR and OBX segments. The message contains relevant information about the report, including procedure, procedure modifiers, diagnostic code, interpreting physician, impression text and report text.
ITEM: RA SEND ORU
ITEM: **RA TCP ORU**
ENTRY ACTION: Q
SERVER APPLICATION: RA-SERVER-IMG
EVENT TYPE: R01
VERSION ID: 2.1
TIMESTAMP: 57240,38053
MESSAGE TYPE RECEIVED: ORU
PROCESSING ID: PRODUCTION
GENERATE/PROCESS ACK ROUTINE: Q

NAME: RA TCP ORM
ITEM TEXT: TCP Client
TYPE: subscriber
CREATOR: 0
PACKAGE: RADIOLOGY/NUCLEAR MEDICINE
EXIT ACTION: Q
ENTRY ACTION: Q
TIMESTAMP: 57223,45356
CLIENT (SUBSCRIBER): RA-CLIENT-TCP
MESSAGE TYPE RECEIVED: ACK
EVENT TYPE: O01
PROCESSING ID: PRODUCTION
LOGICAL LINK: RA-MED
VERSION ID: 2.1
MESSAGE TYPE GENERATED: ORM
GENERATE/PROCESS ROUTINE: Q
SENDING FACILITY REQUIRED?: NO
RECEIVING FACILITY REQUIRED?: NO
SECURITY REQUIRED?: NO
DATE/TIME OF MESSAGE REQUIRED?: YES
(The above record, RA TCP ORM, is sent via the RAD/NUC MED patch for MedSpeak.)

NAME: RA TCP ORU
ITEM TEXT: TCP Client
TYPE: subscriber
CREATOR: 0
PACKAGE: RADIOLOGY/NUCLEAR MEDICINE
EXIT ACTION: Q
ENTRY ACTION: Q
TIMESTAMP: 57223,46072
CLIENT (SUBSCRIBER): RA-CLIENT-TCP
MESSAGE TYPE RECEIVED: ACK
EVENT TYPE: R01
PROCESSING ID: PRODUCTION
LOGICAL LINK: RA-MED
VERSION ID: 2.1
MESSAGE TYPE GENERATED: ORU
GENERATE/PROCESS ROUTINE: Q
SENDING FACILITY REQUIRED?: NO
RECEIVING FACILITY REQUIRED?: NO
SECURITY REQUIRED?: NO
DATE/TIME OF MESSAGE REQUIRED?: YES
(The above record, RA TCP ORU, is sent via the RAD/NUC MED patch for MedSpeak.)

NAME: RA SEND ORM
ITEM TEXT: Client for Imaging (ORM)
TYPE: subscriber
CREATOR: 0
PACKAGE: RADIOLOGY/NUCLEAR MEDICINE
DESCRIPTION: This protocol receives the HL7 message.
EXIT ACTION: Q
ENTRY ACTION: Q
TIMESTAMP: 56992,58565
CLIENT (SUBSCRIBER): RA-CLIENT-IMG
MESSAGE TYPE RECEIVED: ORM
EVENT TYPE: O01
PROCESSING ID: PRODUCTION
VERSION ID: 2.1
MESSAGE TYPE GENERATED: ACK
GENERATE/PROCESS ROUTINE: Q
SENDING FACILITY REQUIRED?: NO
RECEIVING FACILITY REQUIRED?: NO
SECURITY REQUIRED?: NO
DATE/TIME OF MESSAGE REQUIRED?: YES

NAME: RA SEND ORU
ITEM TEXT: Client for Imaging (ORU)
TYPE: subscriber
CREATOR: 0
PACKAGE: RADIOLOGY/NUCLEAR MEDICINE
DESCRIPTION: This protocol receives the HL7 message.
EXIT ACTION: Q
ENTRY ACTION: Q
TIMESTAMP: 56992,58732
CLIENT (SUBSCRIBER): RA-CLIENT-IMG
MESSAGE TYPE RECEIVED: ORU
EVENT TYPE: R01
PROCESSING ID: PRODUCTION
VERSION ID: 2.1
MESSAGE TYPE GENERATED: ACK
GENERATE/PROCESS ROUTINE: Q
SENDING FACILITY REQUIRED?: NO
RECEIVING FACILITY REQUIRED?: NO
SECURITY REQUIRED?: NO
DATE/TIME OF MESSAGE REQUIRED?: YES

Note: The RA VOICE TCP SERVER RPT protocol name must remain exactly as it is appears below. This name is hard-coded in one of the RA* namespace interface routines, so changing its name would cause problems with the interface.

NAME: RA VOICE TCP SERVER RPT
ITEM TEXT: Voice TCP sends report to VISTA
TYPE: event driver
CREATOR: 0
PACKAGE: RADIOLOGY/NUCLEAR MEDICINE
DESCRIPTION: Driver protocol for sending report to VISTA Radiology/Nuclear Medicine. This protocol is used by the HL7 package to process radiology/nuclear med reports coming into VISTA from commercial voice recognition units using TCP/IP for message flow.
ITEM: RA VOICE TCP REPORT
TIMESTAMP: 57236,55244
SERVER APPLICATION: RA-CLIENT-TCP
MESSAGE TYPE RECEIVED: ORU
EVENT TYPE: R01
PROCESSING ID: PRODUCTION
VERSION ID: 2.1
GENERATE/PROCESS ACK ROUTINE: Q
(The above record, RA VOICE TCP SERVER RPT, is sent with the RAD/NUC MED patch for MedSpeak.)

NAME: RA VOICE TCP REPORT
ITEM TEXT: Voice TCP sends report to VISTA
TYPE: subscriber
CREATOR: 0
PACKAGE: RADIOLOGY/NUCLEAR MEDICINE
DESCRIPTION: Subscriber protocol for sending report to VISTA Radiology/Nuclear Medicine. This protocol is used by the HL7 package to process messages sent to VISTA from a COTS voice recognition unit using TCP/IP for message flow. This protocol should be entered in the ITEM multiple of the RA VOICE TCP SERVER RPT protocol.
EXIT ACTION: Q
ENTRY ACTION: Q
TIMESTAMP: 57236,54083
CLIENT (SUBSCRIBER): RA-SERVER-IMG

MESSAGE TYPE RECEIVED: ORU
EVENT TYPE: R01
PROCESSING ID: PRODUCTION
LOGICAL LINK: MED-RA
VERSION ID: 2.1
MESSAGE TYPE GENERATED: ACK
GENERATE/PROCESS ROUTINE: D ^RAHLBMS
SENDING FACILITY REQUIRED?: NO
RECEIVING FACILITY REQUIRED?: NO
SECURITY REQUIRED?: NO
DATE/TIME OF MESSAGE REQUIRED?: YES

(The above record, RA VOICE TCP REPORT, is sent with the RAD/NUC MED patch for MedSpeak.)

HL LOWER LEVEL PROTOCOL PARAMETER FILE #869.2 :

This file is used to identify the TCP/IP address of the MedSpeak unit, as well as the TCP/IP port numbers that will be used. These addresses are all site-specific. In this sample the messages use the lower level protocols as follows:

- RA-MED LLP is used to send order messages (i.e., exam registered, exam cancelled, patient examined, and report verified or released/not verified) from VISTA to MedSpeak. The same link is used to send order Acknowledgement messages to VISTA.

- MED-RA LLP is used to send reports created on the MedSpeak unit to VISTA. The same link is used to send report Acknowledgement messages from VISTA to MedSpeak.

In the example below, 152.129.2.9 is the MedSpeak TCP/IP address on the LAN. The MedSpeak system records the originating TCP/IP address with each order record and sends reports back to the originating TCP/IP address. On systems running more than one instance of TaskMan, the link tasks must be forced to start up on the same CPU (i.e. same TCP/IP address) every time. This is accomplished by entering a "STARTUP NODE". If this is not done, MedSpeak will shut down the links and the interface will crash.

The STARTUP NODE field should ONLY be populated on Alpha/AXP systems that are running more than one instance of TaskMan. The STARTUP NODE information listed below is only an example.

NAME: RA-MED LLP TCP/IP ADDRESS: **152.129.2.9** TCP/IP SERVICE TYPE: CLIENT (SENDER) STARTUP NODE: **VAH:523A04**	LLP TYPE: TCP TCP/IP PORT: **5010** PERSISTENT: YES	(VISTA sends order messages to MedSpeak. MedSpeak sends Acknowledgement Messages to acknowledge the order. An order is one of : exam registered, exam canceled, patient examined, and report messages.)

NAME: MED-RA LLP [1]TCP/IP ADDRESS: [2]TCP/IP SERVICE TYPE: [5]STARTUP NODE:	LLP TYPE: TCP [3]TCP/IP PORT: **5012** [4]PERSISTENT:	(MedSpeak sends reports to VISTA when someone signs a report on the MedSpeak unit. VISTA acknowledges the MedSpeak report.)

Note: Please consult the HEALTH LEVEL SEVEN (HL7) TCP/IP SUPPLEMENT for information on single and multi-threaded listeners

Note: The MedSpeak agentapp.ini does not contain TCP/IP addresses, but it does have to be configured for TCP/IP PORT numbers. For this sample, the MedSpeak agentapp.ini file would have the following **port configuration entries**:

Order_Port = 5010
Report_Port = 5012

HL LOGICAL LINK FILE #870 :

This file contains the links used by the HL7 package to send messages. This file stores parameters that define the behavior of the lower level protocols. This file also stores information that is used with the Systems Link Monitor, which gives the user feedback about the state of each link. When a message is received, the link moves from an IDLE state to a READING state.

[1] DSM for Open VMS: null, Cache for NT: IP address of the listener system
[2] sites without a UCX Listener: SINGLE LISTENER, sites with a UCX Listener: MULTI LISTENER
[3] for UCX Listeners, this port number should equal the port number defined in the UCX Service
[4] should be null, this field is ignored for Single and Multi Listeners
[5] DCL Context: single listener, enter box-volume pair; UCX Listener, leave null

In this sample the links are used for the following messages:

- RA-MED is used to send order messages (i.e., exam registered, exam cancelled, patient examined, and report verified or released/not verified) from VISTA to MedSpeak. This link also receives the order Acknowledgement from MedSpeak.

- MED-RA is used to send reports created on the MedSpeak unit to VISTA. It is also used to send report Acknowledgement messages from VISTA to MedSpeak

This sample shows active, run-time data. DO NOT add anything to the entries shown below. The fields, NODE and LLP PARAMETERS, are populated by the Rad/Nuc Med patch RA*5*4 for MedSpeak. The remainder of the fields are populated by the HL7 package when you start up the links.

With HL*1.6*14, you may choose to automatically start all HL7 Logical Links and Inbound/Outbound Filers, once TaskMan is restarted. This can be accomplished by following these steps:

1) Using the TaskMan option, Schedule/Unschedule Options (XUTM SCHEDULE), select the option, Restart All Links and Filers (HL TASK RESTART), and place an 'S' in the SPECIAL QUEUEING field.

2) Using FileMan, edit the AUTOSTART field (4.5) in File #870. For Single Listener sites, set AUTOSTART to '1' (Enabled) if you want MED-RA and RA-MED to start automatically after TaskMan is restarted. For sites running a UCX Listener, set AUTOSTART to '1' (Enabled) for the RA-MED link only.

NODE: RA-MED	LLP PARAMETERS: RA-MED LLP
LLP ONLINE: YES	STATE: IDLE
TIME STARTED: NOV 13, 1997@08:46:01	TASK NUMBER: 46845
SHUTDOWN LLP ?: NO	AUTOSTART: **1** (to auto-start this link)
IN QUEUE FRONT POINTER: 0	OUT QUEUE FRONT POINTER: 0
IN QUEUE BACK POINTER: 0	OUT QUEUE BACK POINTER: 0
NODE: MED-RA	LLP PARAMETERS: MED-RA LLP
LLP ONLINE: YES	STATE: IDLE
TIME STARTED: NOV 13, 1997@08:45:38	TASK NUMBER: 46844
SHUTDOWN LLP ?: NO	[1]AUTOSTART: **1** (to auto-start this link)
IN QUEUE FRONT POINTER: 0	OUT QUEUE FRONT POINTER: 0
IN QUEUE BACK POINTER: 0	OUT QUEUE BACK POINTER: 0

[1] should be DISABLED for sites running a UCX Listener

VISTA ERROR MESSAGE AND TROUBLESHOOTING TABLE

Error Message	Cause/Solution
Missing Case Number Internal Patient ID Missing Missing Exam Date Missing Exam Date and/or Case Number Missing Patient ID Missing report date Missing Internal Patient ID Invalid Report Date	HL7 message from vendor does not contain adequate information to determine case number, or patient, or exam date. (These errors should not happen in a debugged, operational interface.)
Internal patient identifier and SSN don't match	Could happen if patient SSN in VISTA was changed/corrected after an exam was registered in VISTA, but before a report was created on MedSpeak. May require IRM to manually change the MedSpeak data to match the corrected VISTA SSN. Before making changes, verify that the patient report applies to the right patient.
Invalid Exam Date and/or Case Number Report for CANCELLED case not permitted Please use VISTA to edit CANCELLED printset cases.	Unlikely, but could happen if an exam is deleted or cancelled from Rad/Nuc Med at a time when the cancel message cannot reach MedSpeak, or if a pre-existing MedSpeak report that was once rejected is re-sent after the exam is deleted or cancelled. A failure to deliver the cancel message to MedSpeak would have had to happen to create this scenario. May need to clean this exam out of the MedSpeak database manually.
Can't add addendum, no report Can't add addendum to an unverified report	Unlikely, but could happen if a report is deleted or unverified in Rad/Nuc Med, then an addendum is sent from MedSpeak. May need to clean this exam out of the MedSpeak database manually and use VISTA Rad/Nuc Med to make corrections.
Report already on file	Unlikely, but could happen if there was a failure to send MedSpeak a message containing a report

	entered on VISTA Rad/Nuc Med.
Missing addendum report/impression text	Unlikely because MedSpeak software should prevent this condition. Could happen if there was an attempted send of MedSpeak report addendum without any text. Re-edit and re-send report from MedSpeak.
Missing Impression Text Impression Text missing for current record	The division where this exam was registered has its Rad/Nuc Med Division file #79 parameter 'Impression Req'd on Rpts' set to 'Yes', but the MedSpeak user did not include an impression when s/he entered the report. Re-edit to add impression text and re-send report from MedSpeak.
No Imaging Type for Location where exam was performed	VISTA Rad/Nuc Med Patient file has a partial, corrupted record for this exam. IRM and Radiology Service should investigate and determine whether to delete the record or attempt to enter missing data.
Provider not classified as resident or staff	MedSpeak user does not have Rad/Nuc Med Personnel classification. Use Rad/Nuc Med Personnel Classification option to enter 'resident' or 'staff' status if appropriate. Re-transmit report.
Residents are not permitted to verify reports	The division where this exam was performed does not allow residents to verify reports. (See Rad/Nuc Med Division file #79 parameter 'ALLOW VERIFYING BY RESIDENTS'). This is a facility-determined practice.
Provider does not meet security requirements to verify report	MedSpeak user does not have the 'RA VERIFY' key. IRM can give this key to the user if it is appropriate, then the report can be re-sent.
Inactive Rad/Nuc Med Classification for Interpreting Physician	The MedSpeak user has been inactivated under the Rad/Nuc Med Personnel Classification option.
Staff review required to verify report	The MedSpeak user has a 'resident' classification, and the division where the exam was performed requires staff review before report verification.

Invalid Impression Text Invalid Report Text	Report or Impression text does not meet VISTA Rad/Nuc Med requirements – possibly too few characters or all special characters.
Missing Diagnostic Code	Unlikely. A null diagnostic code was entered. Re-edit diagnostic code and re-send report.
Invalid Diagnostic Code	Likely to happen. No exact match for diagnostic code found in the Diagnostic Code file #78.3. Check MedSpeak Diagnostic Code table for spelling and typographical errors.
ANOTHER USER IS CURRENTLY EDITING THIS PRINTSET. TRY LATER This report is being edited by another user	Likely to happen in high-volume imaging services. This may happen if another radiology/nuclear medicine employee is editing the same report for a single case, or editing one of the cases or report for a parent/descendant printset when the MedSpeak report is transmitted. Re-send the report later.
An <UNDEFINED> error in the HL7 routine HLTP01 is logged in the error trap	Probable cause: a protocol entered as an item on an event driver protocol is not completely set up. This is likely if there is more than one protocol entered in the 'ITEM' multiple of the event driver protocols RA REG, RA RPT, RA CANCEL, RA EXAMINED. The RA TCP ORU protocol must be an item under RA RPT, and the RA TCP ORM protocol must be an item under the rest of the event drivers. If the RA SEND ORU or RA SEND ORM protocols are also entered, but not in use, they should either be completely set up (see Technical manual) or removed from the item multiple.
Messages not always reaching VISTA machine	Make sure that the MedSpeak knows its own domain name on your LAN. (See instructions from vendor.)
Open-M/Cache systems only -- some %ZISTCP processes continue to run when all links are shut down.	Since Open-M/Cache does not kill off these jobs like DSM, you must manually kill these jobs when all links are down.
Site wants to activate only one or two of the three ORM messages (RA REG, RA EXAMINED, RA CANCEL), but none of the messages go across if any of them is	The inactivated messages may be causing the problem. Delete the data in the Server Application field and the Item multiple field of the event point protocols that are de-activated.

inactivated.	
MedSpeak rejects an ACK message after sending a report. The ACK message generated by VISTA has an incorrect mix of field separators.	The RA VOICE TCP SERVER protocol may have been accidentally renamed. This protocol must not be renamed because it is used to initialize variables, and its name is hard-coded in the Rad/Nuc Med "bridge" program.
On a clustered system running more than one TaskMan, links will not stay up.	Clustered Alpha systems running more than one TaskMan need to run TaskMan in DCL context, and use the link startup parameters in file 869.2, so that the links always start up on the same node. MedSpeak requires persistent connections for links on the same TCP/IP address.
Link statuses indicate that the links are up and running, but no messages are being sent or received.	If the VISTA system crashed or was shut down without first stopping the LLP links, the status looks normal, but the link jobs are no longer running. Shut down the links and start them in the recommended order.

MESSAGE FLOW DIAGRAM

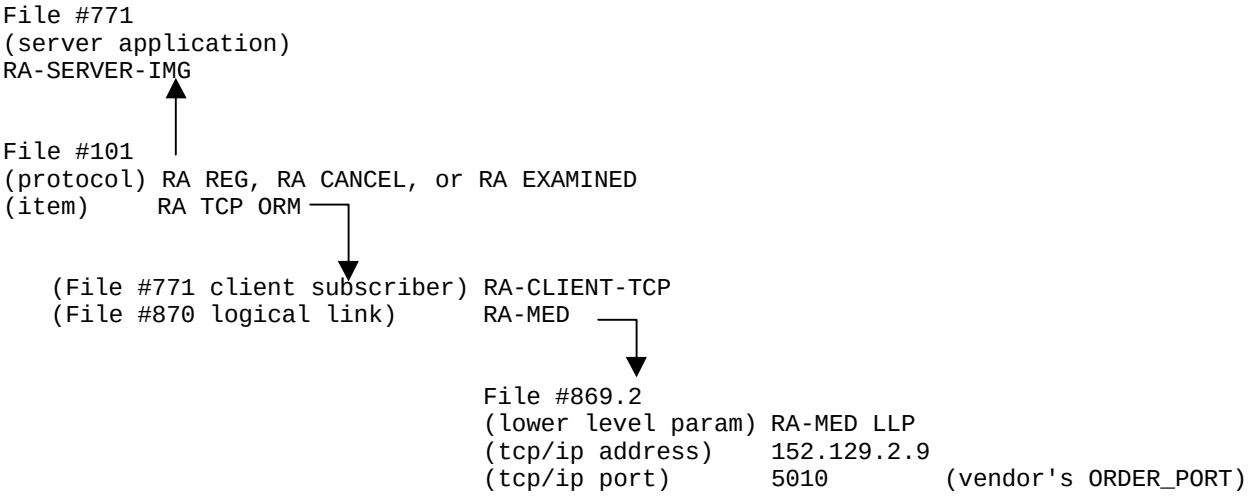
The following chart shows the message flow for each of the 4 event point messages generated by VISTA Rad/Nuc Med, and also for the report message generated by MedSpeak. Two HL7 links are required for this interface:

- One to send new orders, (i.e., registration data, cancels, examined messages, and reports) to MedSpeak, and to receive ACK's from MedSpeak for these orders, and
- A second to receive reports from MedSpeak and send ACK's to MedSpeak.

Since the Rad/Nuc Med report messages are broadcast messages, even the reports that originate from MedSpeak are sent back out to all broadcast recipients, including MedSpeak.

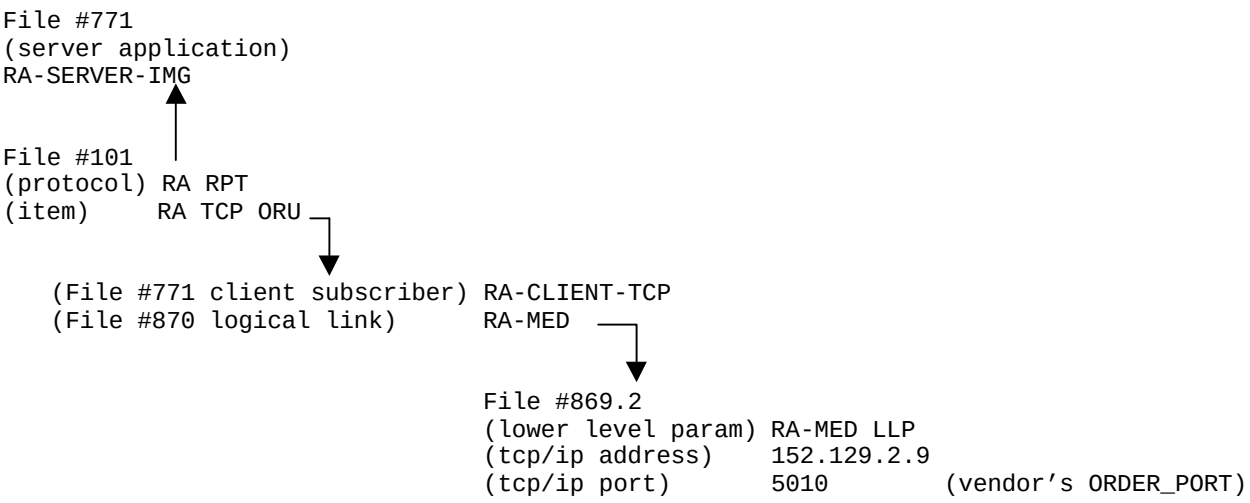
Scenario 1 – VA Sends Order Messages to the Voice Recognition unit

1A. VA RAD/NUC MED SENDS ORDER MESSAGE (ORM) TO VENDOR MACHINE
There are 3 varieties of this message – a) new registration, b) cancelled exam, and c) exam images collected.

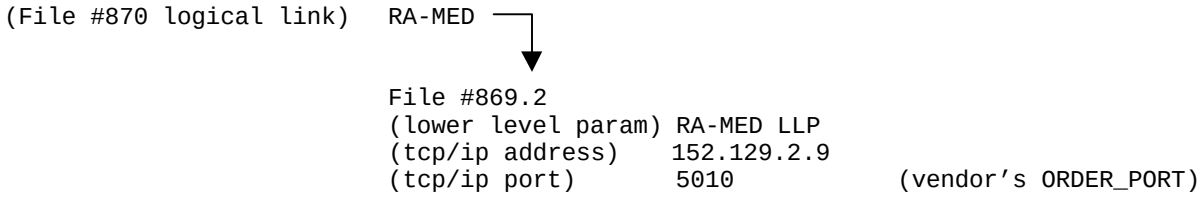


1B. VA RAD/NUC MED SENDS VERIFIED OR PRELIMINARY (RELEASED/NOT VERIFIED) REPORT ORDER MESSAGE (ORU)
TO VENDOR'S MACHINE

This is similar to order message above, but HL7 requires different protocol setup because the message type is ORU rather than ORM.

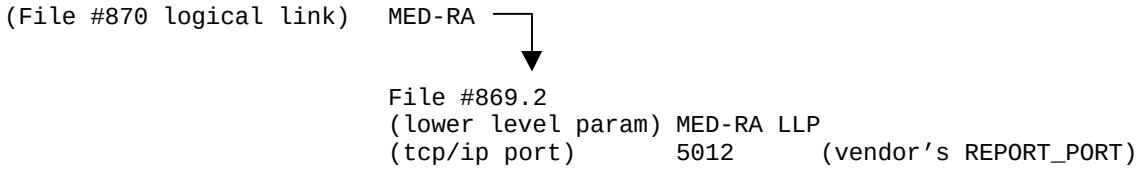


1C. VOICE RECOGNITION UNIT SENDS ACKNOWLEDGEMENT FOR ORDER MESSAGE TO VA

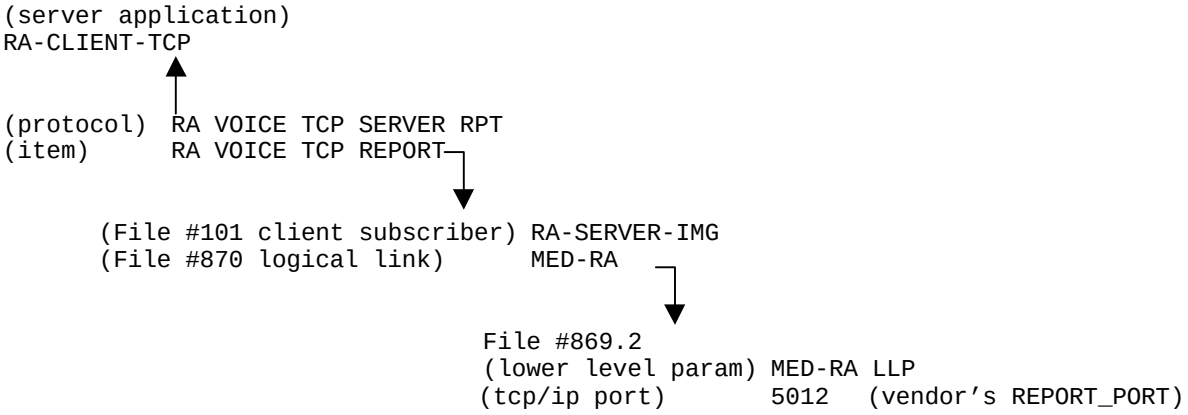


Scenario 2 - Processing Reports from Vendor's machine

2A. VOICE RECOGNITION UNIT SENDS REPORT MESSAGE (ORU) TO VA



2B. VA SENDS REPORT ACKNOWLEDGEMENT TO VENDOR MACHINE



Note: VISTA orders are sent to the voice recognition machine's TCP/IP address, 152.129.2.9. Voice recognition acknowledgements of those orders are sent back on the same link.

Voice recognition reports are sent to the VISTA TCP/IP address of our listener link. VISTA sends acknowledgements of those reports back over the same link.